PROPOSED DAY CARE CENTER
TRAFFIC ANALYSIS

For Submission to:

Upper Dublin Township, Montgomery County, PA

Prepared For:

Harc Group II
485 Devon Park Drive, Suite 106
Wayne, PA 19087

April 14, 2015
TPD # HARG.A.00001

Prepared By:

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INTRODUCTION

Traffic Planning and Design, Inc. (TPD) has completed a Traffic Analysis for the proposed day care center in Upper Dublin Township, Montgomery County, Pennsylvania. The project site is located on the southwest corner of the intersection of Commerce Drive and New Jersey Drive as shown in **Figure 1**. The proposed 7,500 s.f. day care center will replace the former YMCA, as shown in **Figure 2**.

The proposed site will be served by two existing full-movement driveways: one to Commerce Drive and one to New Jersey Drive.

EXISTING ROADWAY NETWORK

A field review of the existing roadway system in the study area was conducted. The existing roadway characteristics within the study area are summarized in **Table 1**.

TABLE 1
ROADWAY CHARACTERISTICS WITHIN STUDY AREA

Roadway	Ownership	Functional Classification/ Roadway Type	Predominant Directional Orientation	Average Daily Traffic	Posted Speed Limit
Commerce Drive	Township	Urban Collector	North-South	6,146	35 mph
New Jersey Drive	Township	N/A	East-West	N/A	Not Posted

Bicycle and Pedestrian Facilities

Based on observations during field visits at the study area intersections, sidewalks currently accommodate pedestrian traffic in the vicinity of the proposed development.

Mass Transit Facilities

Montgomery County and the Upper Dublin area are provided with public transportation by SEPTA. Bus Route 201 has scheduled routes near the proposed site with the closest bus stop on Commerce Drive, approximately 400 feet from the proposed site.

EXISTING TRAFFIC CONDITIONS

Manual Turning Movement Counts

Manual traffic counts were conducted on 15-minute intervals during the weekday morning (7:00 to 9:00 A.M.) and weekday evening (4:00 to 6:00 P.M.) peak periods. Data pertaining to heavy vehicles, pedestrians and transit vehicles were observed during the manual counts. Peak hours and count dates for the study area intersections are identified in **Table 2**.

TABLE 2
MANUAL TRAFFIC COUNT INFORMATION

Intersection	Date of Traffic Counts	Time Period	Intersection Peak Hour[1]
Commerce Drive & New Jersey Drive	Tuesday, March 24, 2015	Weekday A.M.	8:00 to 9:00 A.M.
		Weekday P.M.	4:45 to 5:45 P.M.
Commerce Drive & Site Driveway	Tuesday, March 24, 2015	Weekday A.M.	8:00 to 9:00 A.M.
		Weekday P.M.	4:45 to 5:45 P.M.
New Jersey Drive & Site Driveway	Tuesday, March 24, 2015	Weekday A.M.	8:00 to 9:00 A.M.
		Weekday P.M.	4:45 to 5:45 P.M.

1. Peak Hour consists of the four consecutive 15-minute intervals where the highest traffic volumes occur.

Existing condition traffic volumes for the weekday A.M. and weekday P.M. peak hours are illustrated in **Figure 3**. Manual traffic count data sheets are provided in **Appendix A**.

PROPOSED SITE ACCESS

The proposed site will be served by two existing full-movement driveways: one to Commerce Drive and one to New Jersey Drive

TRIP GENERATION

The trip generation rates for the proposed development were obtained from the *Trip Generation Manual*, Ninth Edition, 2012, an Institute of Transportation Engineers (ITE) Informational Report. The statistics in *Trip Generation* are empirical data based on more than 4,800 trip generation studies. The data are categorized by Land Use Codes, with total vehicular trips for a given land use estimated using an independent variable and statistically generated rates or equations.

For the proposed development, Land Use Code 565 (Day Care Center) from *Trip Generation Manual* was used to calculate the number of vehicular trips the development will generate during the following time periods: (1) weekday A.M. peak hour; and (2) weekday P.M. peak hour. **Table 3** shows the rates/equations and directional percentages for the analyzed time periods.

TABLE 3
ITE TRIP GENERATION DATA

Time Period	Rates/Equations	Entering	Pass-By
Weekday A.M.	T = 12.18*(X)	53%	N/A
Weekday P.M.	T = 12.34*(X)	47%	N/A

T = number of site-generated vehicular trips
X = independent variable (ksf, thousand square feet of gross leasable area)

Pass-By Trips and Diverted Linked Trips

Based on the information provided in the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 8th Edition, not all trips generated by the site are trips that are "new" to the roadway system. In addition to the new trips generated, there are pass-by trips, which are trips that are drawn from the passing traffic stream and do not add trips to the adjacent roadways. Based on an article titled "Trip Generation of Day Care Centers," prepared by Pennoni Associates, Inc. and included in the ITE 1990 Compendium of Technical Papers, daycare facilities have a pass-by rate of 44% during the weekday PM peak hour. A copy of the article is included in **Appendix B**. Since these pass-by trips were described as work-to-home trips by the parents, it can be assumed that during the AM peak hour the pass-by rate would also be 44%, consisting of home-to-work trips. However in order to evaluate a worst case (highest volume) scenario, TPD assumed that all trips will be **new** trips.

The calculated trip generation for the proposed development is shown in **Table 4**.

TABLE 4
TRIP GENERATION SUMMARY

Time Period	Trips		
	Enter	Exit	Total
A.M. Peak Hour	48	43	**91**
P.M. Peak Hour	44	49	**93**

Based on the trip generation analysis summarized in **Table 4**, the proposed day care will generate approximately 91 new trips during the weekday A.M. peak hour and 93 new trips during the weekday P.M. peak hour.

TRIP DISTRIBUTION

The distribution of trips generated by the proposed development was based on the local road network, the existing traffic patterns, the proposed use of the site, and the site driveway locations. The new trips for the proposed development were distributed to the local roadway network based on the percentages shown in **Table 5**.

TABLE 5
TRIP DISTRIBUTION PERCENTAGES

Direction - To/From	Assignment (To/From)	Distribution Percentage
North	via Commerce Drive	50%
South	via Commerce Drive	50%

The assignment of site-generated trips for the proposed development during the weekday A.M. and P.M. peak hours are shown in **Figure 4**.

PROJECTED (BUILD) CONDITION TRAFFIC VOLUMES

The site-generated trips for the proposed development were added to the existing condition traffic volumes to develop projected condition traffic volumes. Projected condition traffic volumes for the weekday A.M. and P.M. peak hours are shown in **Figure 5**.

LEVELS OF SERVICE FOR AN INTERSECTION

For analysis of intersections, level of service is defined in terms of delay, which is a measure of driver discomfort and frustration, fuel consumption, and lost travel time. LOS criteria is stated in terms of control delay per vehicle for a one-hour analysis period. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. The criteria are shown in **Table 6**. Delay, as it relates to level of service, is a complex measure and is dependent upon a number of variables. For signalized intersections, these variables include the quality of vehicle progression, the cycle length, the green time ratio, and the volume/capacity ratio for the lane group in question. For unsignalized intersections, delay is related to the availability of gaps in the flow of traffic on the major street and the driver's discretion in selecting an appropriate gap for a particular movement from the minor street (straight across, left or right turn).

TABLE 6
LEVEL OF SERVICE CRITERIA
UNSIGNALIZED AND SIGNALIZED INTERSECTIONS [1]

Level of Service	Control Delay Per Vehicle (Seconds)	
	Signalized	Unsignalized
A	≤ 10	≤ 10
B	> 10 and ≤ 20	> 10 and ≤ 15
C	> 20 and ≤ 35	> 15 and ≤ 25
D	> 35 and ≤ 55	> 25 and ≤ 35
E	> 55 and ≤ 80	> 35 and ≤ 50
F	> 80 or v/c > 1.0	> 50 or v/c > 1.0

[1] Obtained from Exhibits 18-4 and 19-1 of the Transportation Research Board's *Highway Capacity Manual 2010*

CAPACITY ANALYSIS METHODOLOGY

Capacity analyses were conducted for the weekday A.M. and P.M. peak hours at the study area intersections. These analyses were conducted according to the methodologies contained in the 2010 *Highway Capacity Manual* (HCM) using *Synchro 8* software, a Trafficware product.

The following conditions were analyzed, as applicable:

- Existing conditions;
- Projected conditions (with development).

LEVELS OF SERVICE IN THE STUDY AREA

Level of service (LOS) matrices for the study area intersections are shown in **Table 7** for the weekday A.M. and weekday P.M. peak hours.

TABLE 7
LEVEL OF SERVICE DELAY (SECONDS) SUMMARY

Intersection	Movement	Weekday A.M. Peak Hour		Weekday P.M. Peak Hour	
		Existing Conditions	Projected Conditions	Existing Conditions	Projected Conditions
Commerce Drive & New Jersey Drive	EB L	C	C	B	B
	NB L	A	A	A	A
	ILOS	**A (2.8)**	**A (3.2)**	**A (5.1)**	**A (5.4)**
Commerce Drive & Site Driveway	EB L	A	B	A	B
	NB L	A	A	A	A
	ILOS	**A (0.4)**	**A (1.2)**	**A (0.5)**	**A (1.3)**
New Jersey Drive & Site Driveway	WB L	A	A	A	A
	NB L	A	A	A	A
	ILOS	**A (0.1)**	**A (0.7)**	**A (0.7)**	**A (1.3)**

Projected = Build scenario

ILOS = Overall Intersection Level of Service; Unsignalized ILOS calculated in accordance with Figure 5 of *Policies and Procedures for Transportation Impact Studies*.

As shown in **Table 7**, under projected conditions with the development of the proposed site, the study area intersections will operate at the same overall intersection level of service (ILOS) as under existing conditions, during the weekday A.M. and P.M. peak hours.

All approaches and turning movements at the site driveway intersections will operate at LOS B or better under projected conditions during the weekday A.M. and P.M. peak hours.

GAP ANALYSIS

In order to further evaluate the traffic operations and capacity at the site driveways, gap studies were conducted for the approaches of each driveway. Data collection for the gap studies were conducted on Tuesday, March 24, 2015.

Motorists turning left require simultaneous gaps in both directions of major road traffic. Motorists turning right onto the major road only require gaps in one direction. A technician stationed at the intersections counted the number and duration of these simultaneous (two-way) gaps in traffic during the A.M. and P.M. peak hours. **Table 8** shows the results of the gap study compared to the Projected Conditions traffic volumes. To provide a conservative (worst-case) estimate, it was assumed that all traffic exiting the driveway is turning left.

TABLE 8
GAP STUDY RESULTS

Driveway Location	Peak Hour	Existing Capacity for Left Turns	Total Exiting Traffic (Projected Conditions)
Commerce Drive	Weekday A.M.	409	37
	Weekday P.M.	454	56
New Jersey Drive	Weekday A.M.	525	12
	Weekday P.M.	565	30

Based on the results of the gap analysis, there is currently adequate capacity to accommodate the projected traffic volumes for the weekday A.M and P.M. peak hours.

The full results of the gap study are included in **Appendix D**.

CONCLUSIONS

Based on the results of the traffic access analysis, TPD offers the following conclusions:

- The project site is located on the southwest corner of the intersection of Commerce Drive & New Jersey Drive. The proposed site will consist of 7,500 square foot (sf) day care facility;
- Access to the site is proposed via two full-access driveways: one (1) full-access driveway to Commerce Drive and one (1) full access driveway to New Jersey Drive.
- Upon full build-out, the proposed development is expected to generate 91 new vehicle-trips during the weekday A.M. peak hour and 93 new vehicle-trips during the weekday P.M. peak hour.
- Under the projected conditions, with implementation of the site-related recommendations, all approaches and turning movements at the site driveway intersections with the external roadway network will operate at LOS B or better during weekday A.M. and P.M. peak hours.
- All overall intersection levels of service (ILOS) will operate at an acceptable ILOS B or better during the projected conditions. Furthermore, there are no increases in overall intersection LOS between existing and projected condition scenarios.
- Based on the results of the gap analysis, there is currently adequate capacity to accommodate the projected traffic volumes for the weekday A.M and P.M. peak hours.
- It is TPD's opinion that the construction of the proposed development will not adversely affect the health, safety, and welfare of the community from a traffic engineering perspective.

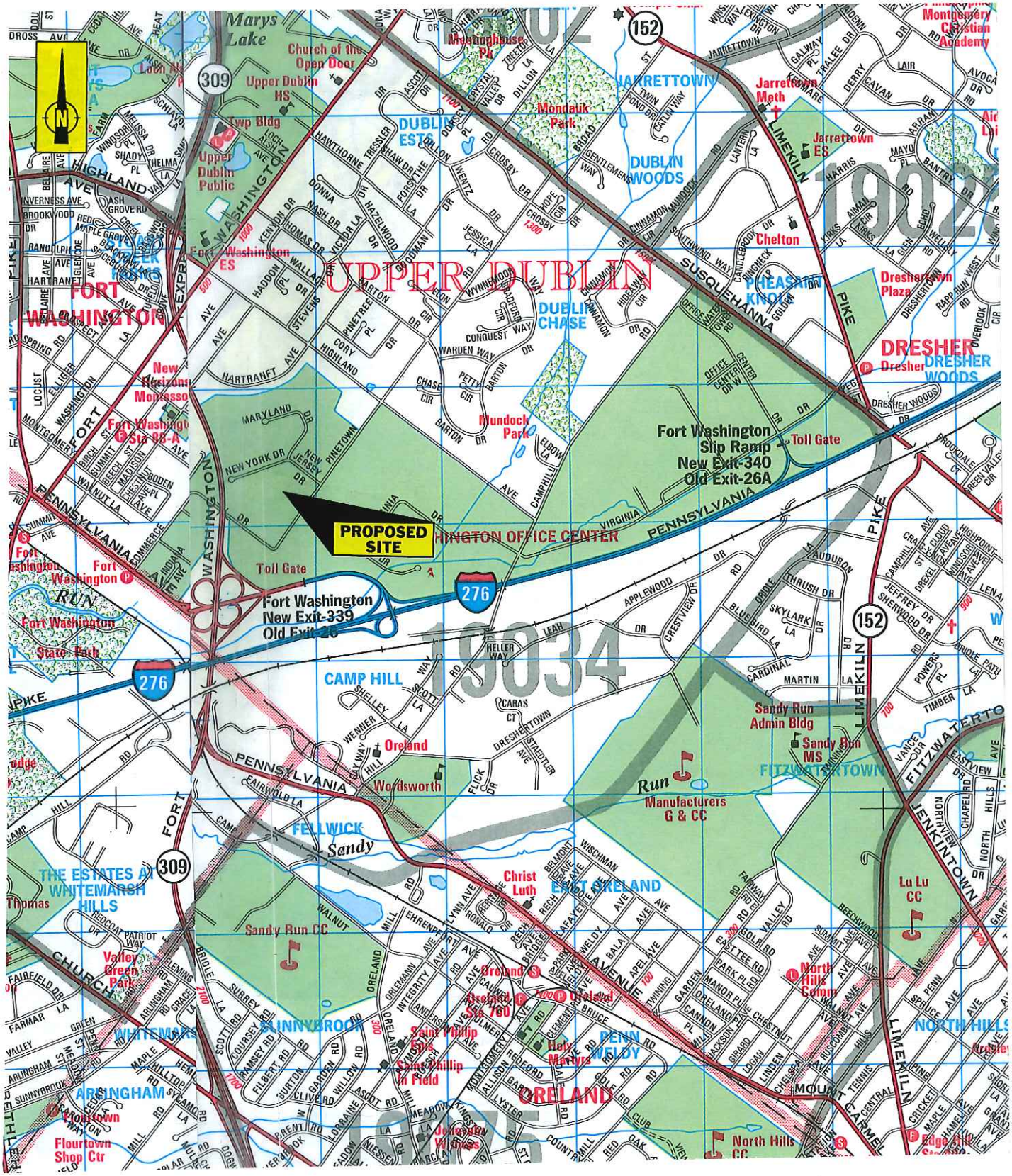

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FIGURE 1

SITE LOCATION

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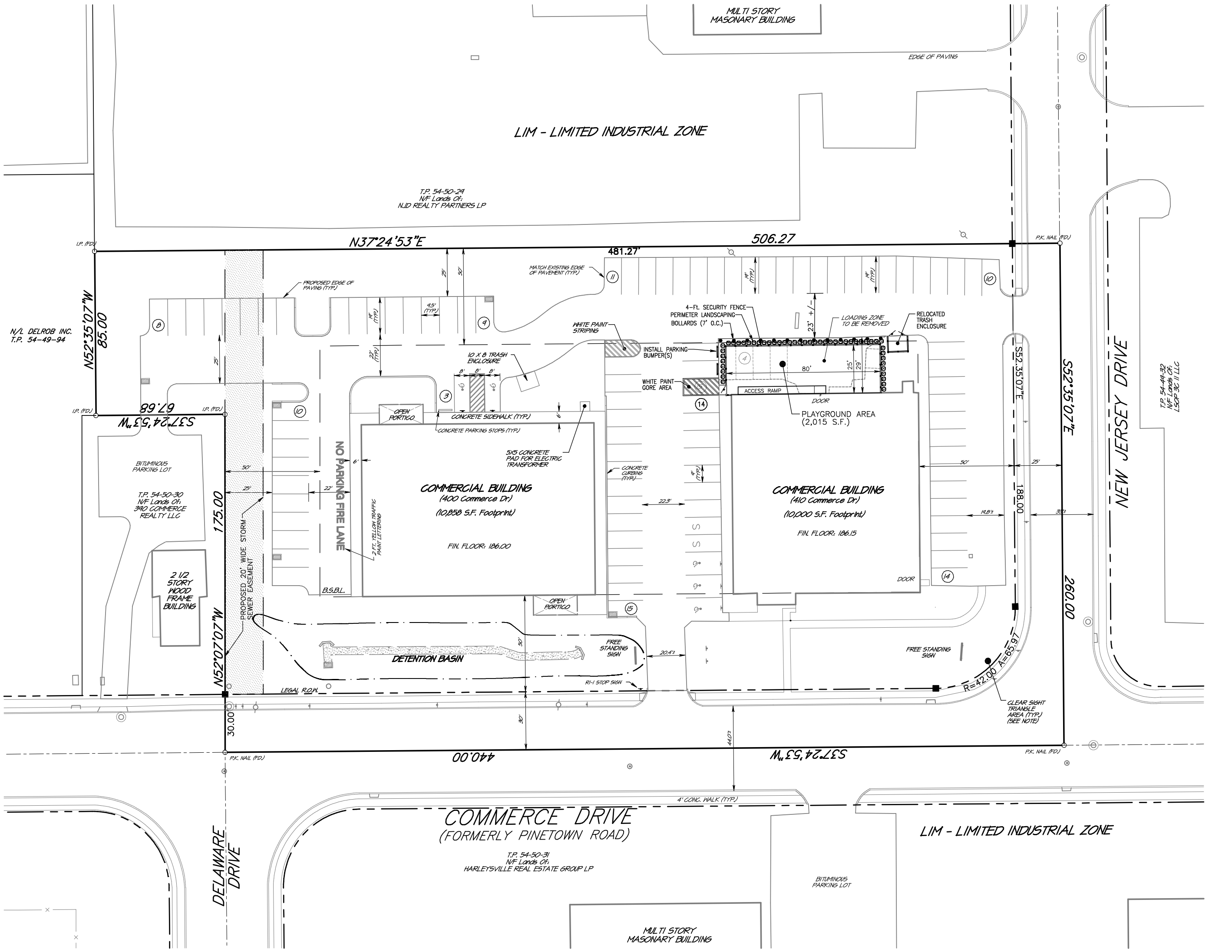

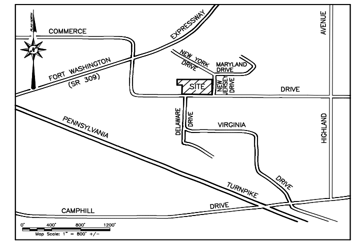

LOCATION MAP

GENERAL PLAN NOTES

BASE EXISTING FEATURES AND SURVEY NOTES:

1. The project site is identified as: Record Owner: HARC GROUP II
   Site Address: 410 COMMERCE DR, FT WASHINGTON, PA
   Parcel ID: T.P. 54-49-31, Alt TP ID: 54-00-04417-00-2
   Gross Area: 119,910 Sq. Ft.
2. The metes and bounds illustrated was derived from a Land Development Plan prepared by Woodrow & Associates, Inc. titled 'Record Plan – Fort Washington Mews' last revised 12/13/1999. Plan prepared without the benefit of a Title Report and was prepared from documents of record. This property may be subject to additional rights of others that might be listed in a Title Report.
3. The topographic and existing features depicted are from a Land Development Plan prepared by Woodrow & Associates, Inc. titled 'Record Plan – Fort Washington Mews' last revised 12/13/1999.
4. This plan was prepared utilizing the following references:
   a. Tax maps and deeds of record as obtained from the Recorder of Deeds online resources.
   b. Existing Soils classifications and mapping has been plotted from maps obtained from the USDA Web Soil Survey website (http://websoilsurvey.sc.egov.usda.gov/) unless otherwise noted.
   c. Site Flood Plain information has been obtained from the FEMA Map Service Center web site. (http://msc.fema.gov).
   d. Aerial photography and additional vertical datum references provided by the PA Spacial Data Access system (PASDA). PAMAP data is based on PA State Plane (South) NAD83 horizontal, NAVD88 vertical datum. Flight date was Spring 2008, updated by DVRPC flight 2010.
5. There has been no field investigation performed to verify any existence of any wetlands, waters of the U.S. or Commonwealth or Alluvial Soils at the time of the site survey.
6. This site is identified on Community Panel Number 420708-0289-E, effective date December 19, 1996 as prepared by the Federal Emergency Management Agency. Portions of the Site fall within Zone X (500-yr flood, with areas of 100-yr with avg depths less than 1-Ft.) and Zone AE (100-yr flood with base elevation of 178.00). No portion of this site lies at or below the FEMA Flood elevation of 178.00. No computational floodplain study has been performed for this plan.
7. All persons digging on this site shall comply with the requirements of Section 5 of PA Act 287 as amended by PA Act 181. State law requires a three (3) business day notice prior to any digging (does not include state holidays or weekends). Dial 8-1-1 or go to www.paonecall.org.
8. Existing subsurface utility information illustrated on these plans were based upon visual field locations obtained as part of site survey operations. Information pertaining to; size, location, depth, etc. of subsurface utilities is approximate in nature and has been obtained as an aid for the project design. The information provided is representative of subsurface conditions only at locations and depths where such information was available. There is no expressed or implied agreement that subsurface utility connections exist between explored locations. Accordingly, utility information shown should not be relied upon for construction purposes. It is incumbent upon the contractor to verify subsurface utilities prior to excavation.

BASE DEVELOPMENT NOTES:

9. The contractor shall ensure that all necessary permits and approvals have been obtained prior to commencement of any site construction activities.
10. Erosion and sedimentation control measures shall be in place and functional prior to any earth disturbance or grading work.
11. Legal rights-of-way width are per deed information. Ultimate rights-of-way width were derived from municipal ordinances. The area between the project Title Line and the Ultimate Rights-of-Way is/are offered in perpetuity for dedication to the agency having jurisdiction over said right-of-way at time of dedication.
12. Contractor to ensure compliance with ADA regulations.
13. This project shall be served by public sanitary sewer and water services.
14. Nothing shall be permitted to be set on, placed or planted within, the area of any utility or storm water easement except lawns or suitable low ground cover.
15. Construction materials and procedures shall follow Pennsylvania Department of Transportation Specifications and Standard Drawings (latest edition).
16. Any/all storm water conveyance system(s) and detention facilities shown on these plans are a basic and perpetual part of the storm water management system for this Township, and as such, are to be protected, maintained and preserved in accordance with the approved final plans. The Township and/or its agents may reserve the right and privilege to enter upon such lands from time to time for the purpose of inspection of said storm water management system in order to determine that the structural design and integrity are being maintained.

ZONING and SITE DATA SCHEDULE

Zoning District: EC Employment Center District

Item	Section	Requirement	Plan Provided
Minimum Lot Area	255-115.A(2)	2 Acres	2.7528 Acres
Minimum Lot Width [1]	255-115.A(3)	200 Ft.	> 100 Ft.
Yard Setbacks			
Front Yard	255-115.A(4)(a)	50 Ft.	> 50 Ft.
Side Yard	255-115.A(4)(b)	50 Ft.	> 25 Ft.
Rear Yard	255-115.A(4)(c)	50 Ft.	> 50 Ft.
Maximum Bldg Coverage	255-115.B(1)	25.77 % [1]	17.39 %
Maximum Lot Impervious	255-115.B(2)	60 %	51.72 %
Gross Floor Area	255-115.B(3)	11,000 S.F./Acre	20,858 S.F.
Maximum Principal Bldg Height	255-115.B(5)(a)[1]	50 Ft./4 Stories	< 50 Ft./4 Stories
Parking Setback	255-116.A	25 Ft.	25 Ft.
Parking Quantity	255-135.C(5)(b) 255-135.C(5)(c) 255-135.C(8) 255-135.C(19)	1/250 S.F. (Office) 1/150 S.F. (Medical) 1/1000 S.F. (Other) 1/10 Students + 1/Employee [2]	See Parking Summary

[1] 20% of S.F. of lot, plus 2.5% per Acre multiplied by the Lot area in acres, not to exceed 40% 2.31*2.5 = 5.77 + 20 = 25.77%

[2] Parking Quantity Based on Gross Floor Area

SITE IMPERVIOUS

Based on NET Tract Area of: 119,910 Sq. Ft. / 2.7528 Acres

EXISTING SITE:	
BUILDINGS and STRUCTURES:	20,858 Sq. Ft. / 17.39 %
CONCRETE (WALKS/PADS/HARDSCAPE):	2,557 Sq. Ft.
ASPHALT PAVING:	38,604 Sq. Ft.
SITE TOTAL:	62,019 Sq. Ft. / 51.72 %

PARKING SUMMARY

400 COMMERCE DRIVE:

USE:	AREA / REQUIREMENT:	SPACES NEEDED:
OFFICE (General)	4,000 S.F. @ 1/250 =	16.0 Spaces
OFFICE (Medical)	1,000 S.F. @ 1/150 =	7.0 Spaces
COMMERCIAL SCHOOL (Yoga) (30 Students + 5 Employees)	@ 1/2 Students + 1/Employee =	20.0 Spaces
	TOTAL REQUIRED =	43.0 Spaces

410 COMMERCE DRIVE:

USE:	AREA / REQUIREMENT:	SPACES NEEDED:
OTHER (Commercial)	2,500 S.F. @ 1/1000 =	3.0 Spaces
DAYCARE (90 Students)	@ 1/10 Students =	9.0 Spaces
DAYCARE (15 Employees)	@ 1/Employee =	15.0 Spaces
	TOTAL REQUIRED =	27.0 Spaces
	SITE TOTAL REQUIRED =	70.0 Spaces
	SITE TOTAL PROVIDED =	94.0 Spaces

PLAN LEGEND

- Tract Boundary Line
- Legal Right-of-Way Line
- Existing Roadway Centerline
- Supplemental Contour
- Index Contour
- Existing Drive / Paving Limit
- Existing Vegetation Limit
- Existing Fence Line

SKETCH PLAN

PROPOSED DAYCARE FACILITY

FORT WASHINGTON MEWS

UPPER DUBLIN TOWNSHIP – MONTGOMERY COUNTY – PENNSYLVANIA

WOODROW & ASSOCIATES, INC.
MUNICIPAL / CIVIL CONSULTING ENGINEERS
1108 North Bethlehem Pike / Suite 5 – Lower Gwynedd – PA 19002
Phone: (215) 542-5648 Fax: (215) 542-5679
Web: www.WoodrowInc.com

Layer List: Sht02_Record
Plan Date: Feb. 02, 2015
Job No: 97-0606 D
Design Mgr: J.H.K.
Proj. Mgr: T.P.W.
Sheet No: 1 of 1

Record Owner: HARC GROUP II, P.O. Box 839, Gwynedd Valley, PA 19437

Applicant:

Parcel Information: Site Address: 410 COMMERCE DR; T.P. 54-49-31; Alt TP ID: 54-00-04417-00-2; Deed Book: 5208; Page: 2089; Gross Area: 119,910 Sq. Ft.; Net Area: 100,586 Sq. Ft.

PLAN NORTH (S, W, N, E)

30' 0' 30' 60'
SCALE IN FEET (1" = 30'-0")

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COMMONWEALTH OF PENNSYLVANIA – REGISTERED PROFESSIONAL ENGINEER – TIMOTHY P. WOODROW – No. 038725-E

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FIGURE 2

SITE PLAN

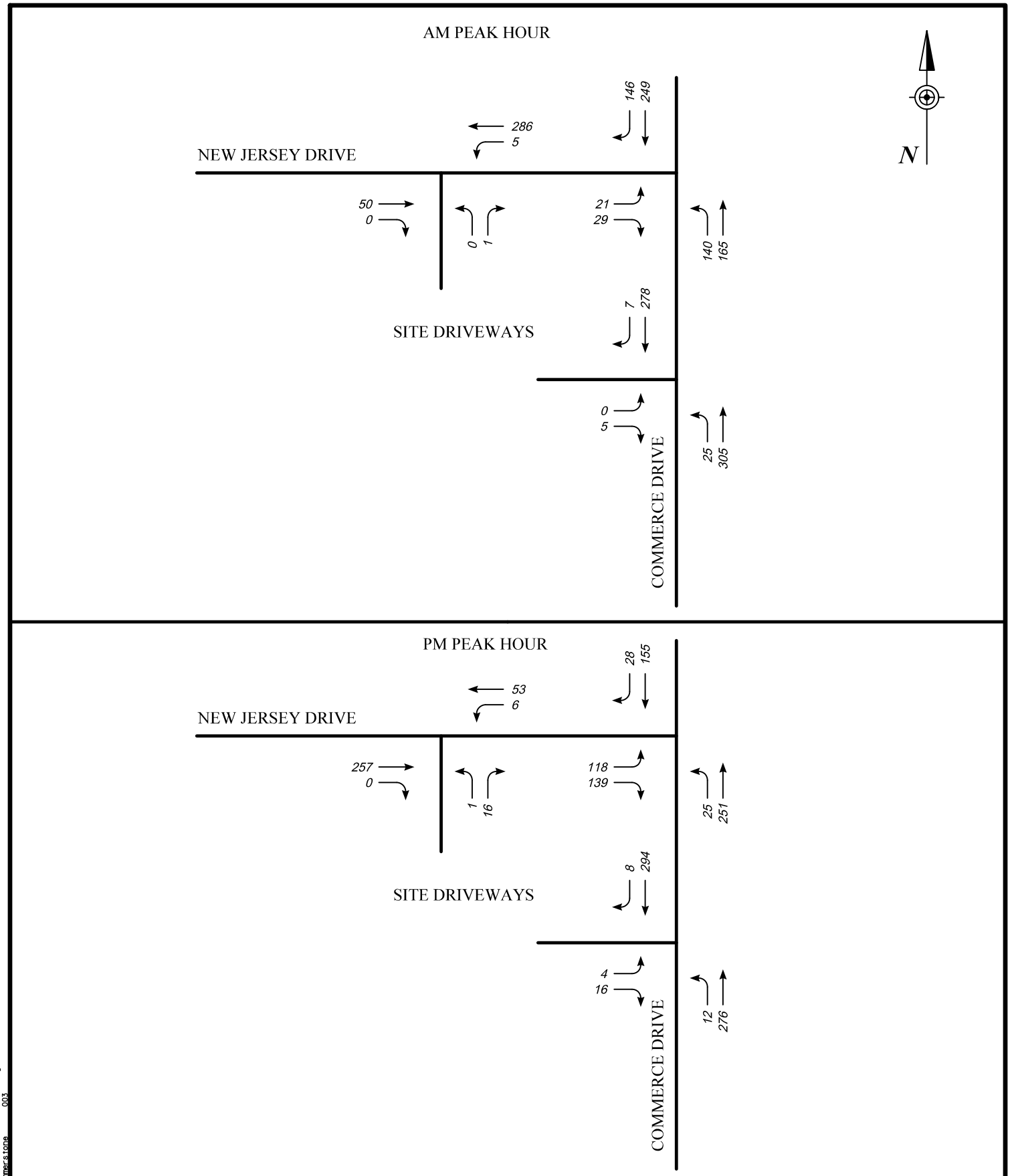

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FIGURE 3

EXISTING CONDITIONS
WEEKDAY AM AND PM PEAK HOURS
TRAFFIC VOLUMES

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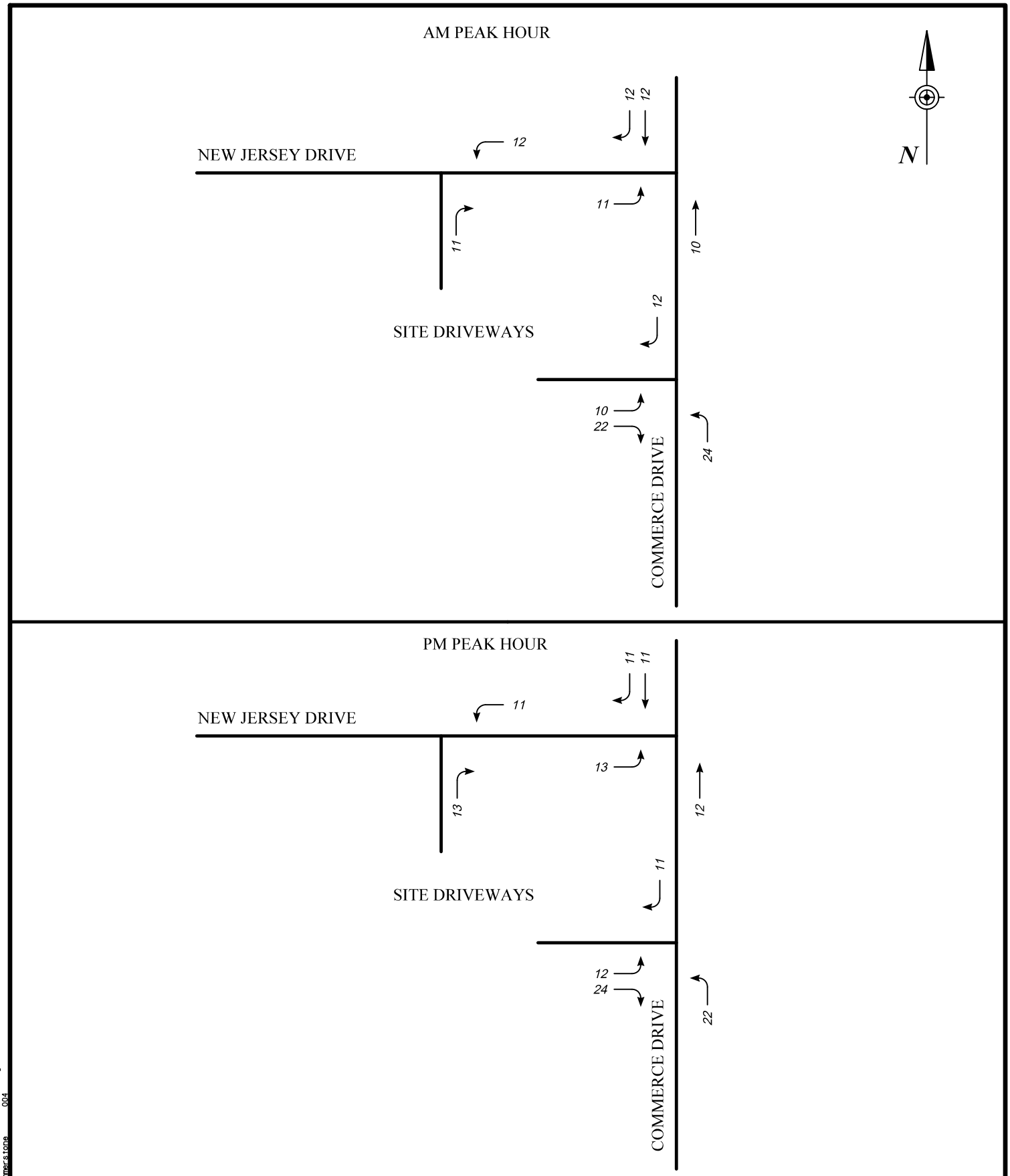

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FIGURE 4

TRIP DISTRIBUTION
WEEKDAY AM AND PM PEAK HOURS
NEW TRIPS

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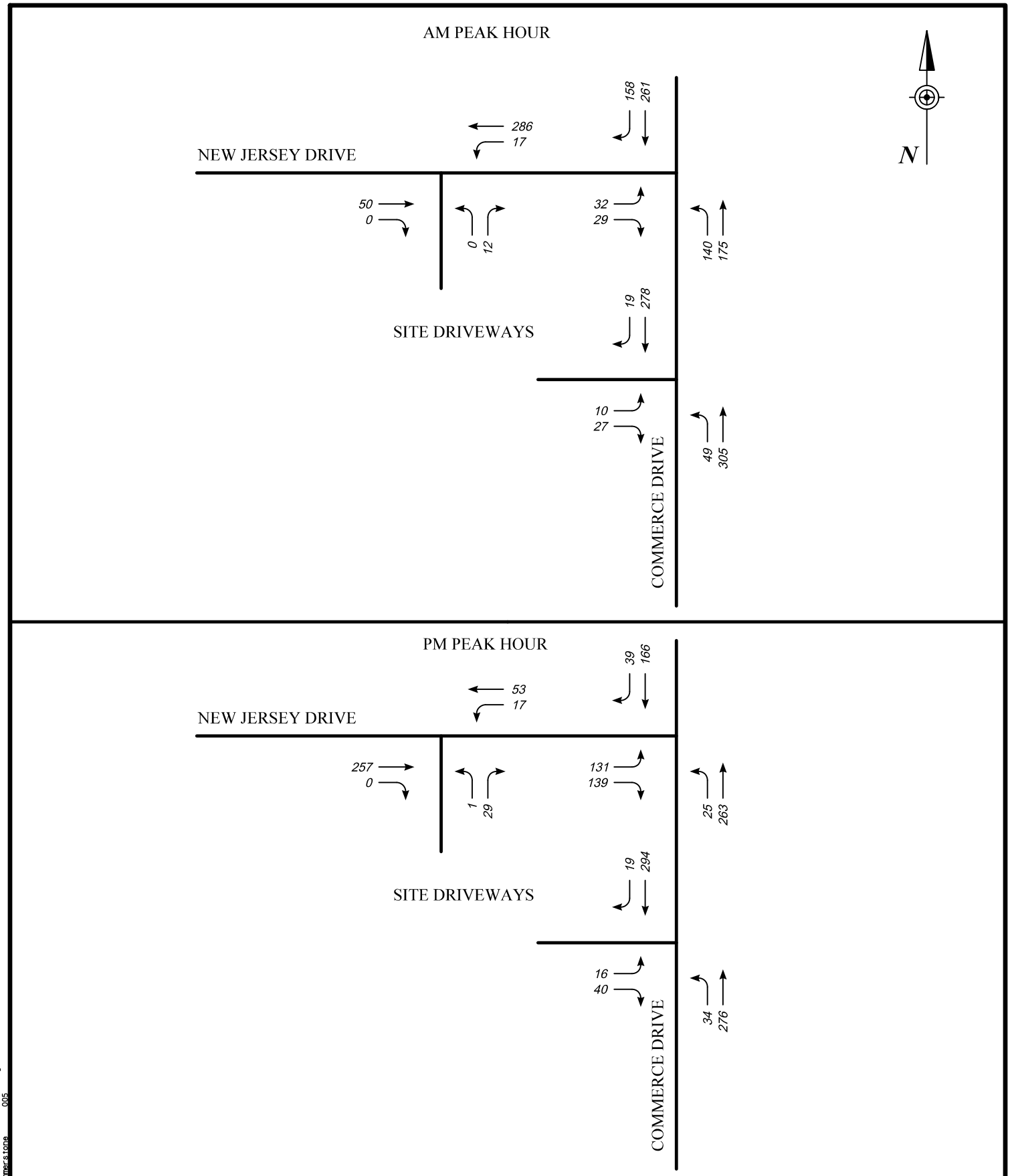

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FIGURE 5

PROJECTED CONDITIONS
WEEKDAY AM AND PM PEAK HOURS
TRAFFIC VOLUMES

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APPENDIX A

MANUAL TRAFFIC COUNTS

Counter:: MIO
Counted By:: RK
Weather:: Overcast

Traffic Planning and Design, Inc
2500 East High Street
Suite 650
Pottstown, Pennsylvania, United States 19464
610.326.3100 mbressler@trafficpd.com

Count Name: Commerce Drive & New Jersey Drive - AM & PM
Site Code:
Start Date: 03/24/2015

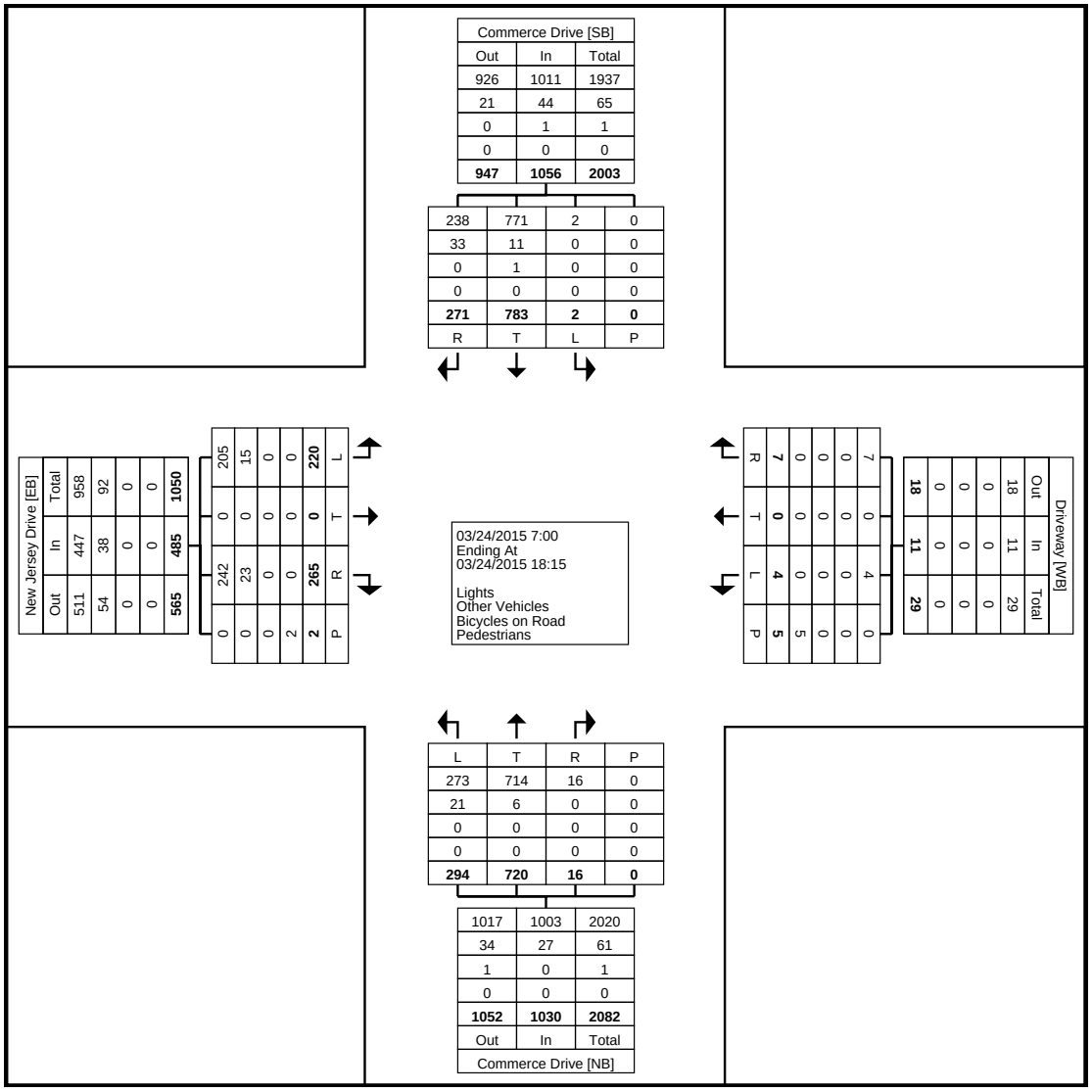
Turning Movement Data

Start Time	New Jersey Drive Eastbound					Driveway Westbound					Commerce Drive Northbound					Commerce Drive Southbound					
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
7:00	3	0	2	0	5	0	0	0	0	0	29	23	0	0	52	0	40	21	0	61	118
7:15	2	0	2	0	4	0	0	0	1	0	28	27	0	0	55	0	58	12	0	70	129
7:30	2	0	2	0	4	0	0	0	1	0	18	37	0	0	55	0	58	18	0	76	135
7:45	2	0	3	0	5	0	0	0	0	0	22	37	0	0	59	0	74	19	0	93	157
Hourly Total	9	0	9	0	18	0	0	0	2	0	97	124	0	0	221	0	230	70	0	300	539
8:00	0	0	3	1	3	0	0	0	0	0	22	36	0	0	58	0	74	21	0	95	156
8:15	1	0	3	0	4	0	0	0	0	0	35	43	0	0	78	0	58	38	0	96	178
8:30	4	0	4	0	8	0	0	0	0	0	34	44	0	0	78	1	66	38	0	105	191
8:45	16	0	19	1	35	0	0	0	0	0	49	42	1	0	92	0	51	49	0	100	227
Hourly Total	21	0	29	2	50	0	0	0	0	0	140	165	1	0	306	1	249	146	0	396	752
9:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
16:00	17	0	21	0	38	1	0	0	0	1	9	34	0	0	43	0	50	10	0	60	142
16:15	18	0	16	0	34	0	0	0	1	0	10	39	0	0	49	1	39	5	0	45	128
16:30	22	0	27	0	49	0	0	2	1	2	4	45	2	0	51	0	36	4	0	40	142
16:45	15	0	13	0	28	0	0	1	1	1	6	57	4	0	67	0	47	10	0	57	153
Hourly Total	72	0	77	0	149	1	0	3	3	4	29	175	6	0	210	1	172	29	0	202	565
17:00	44	0	40	0	84	2	0	0	0	2	5	72	4	0	81	0	45	8	0	53	220
17:15	29	0	31	0	60	0	0	2	0	2	7	77	3	0	87	0	29	6	0	35	184
17:30	30	0	55	0	85	0	0	2	0	2	7	45	1	0	53	0	34	4	0	38	178
17:45	15	0	24	0	39	0	0	0	0	0	9	62	1	0	72	0	24	7	0	31	142
Hourly Total	118	0	150	0	268	2	0	4	0	6	28	256	9	0	293	0	132	25	0	157	724
18:00	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Grand Total	220	0	265	2	485	4	0	7	5	11	294	720	16	0	1030	2	783	271	0	1056	2582
Approach %	45.4	0.0	54.6	-	-	36.4	0.0	63.6	-	-	28.5	69.9	1.6	-	-	0.2	74.1	25.7	-	-	-
Total %	8.5	0.0	10.3	-	18.8	0.2	0.0	0.3	-	0.4	11.4	27.9	0.6	-	39.9	0.1	30.3	10.5	-	40.9	-
Lights	205	0	242	-	447	4	0	7	-	11	273	714	16	-	1003	2	771	238	-	1011	2472
% Lights	93.2	-	91.3	-	92.2	100.0	-	100.0	-	100.0	92.9	99.2	100.0	-	97.4	100.0	98.5	87.8	-	95.7	95.7
Other Vehicles	15	0	23	-	38	0	0	0	-	0	21	6	0	-	27	0	11	33	-	44	109
% Other Vehicles	6.8	-	8.7	-	7.8	0.0	-	0.0	-	0.0	7.1	0.8	0.0	-	2.6	0.0	1.4	12.2	-	4.2	4.2
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0	1	0	-	1	1
% Bicycles on Road	0.0	-	0.0	-	0.0	0.0	-	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.1	0.0	-	0.1	0.0
Pedestrians	-	-	-	2	-	-	-	-	5	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-

Counter:: MIO
Counted By:: RK
Weather:: Overcast

Traffic Planning and Design, Inc
2500 East High Street
Suite 650
Pottstown, Pennsylvania, United States 19464
610.326.3100 mbressler@trafficpd.com

Count Name: Commerce Drive & New Jersey Drive - AM & PM
Site Code:
Start Date: 03/24/2015
Page No: 2



Turning Movement Data Plot

Counter:: MIO
Counted By:: RK
Weather:: Overcast

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2500 East High Street
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Count Name: Commerce Drive & New Jersey Drive - AM & PM
Site Code:
Start Date: 03/24/2015

Turning Movement Peak Hour Data (8:00)

Start Time	New Jersey Drive Eastbound					Driveway Westbound					Commerce Drive Northbound					Commerce Drive Southbound					
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
8:00	0	0	3	1	3	0	0	0	0	0	22	36	0	0	58	0	74	21	0	95	156
8:15	1	0	3	0	4	0	0	0	0	0	35	43	0	0	78	0	58	38	0	96	178
8:30	4	0	4	0	8	0	0	0	0	0	34	44	0	0	78	1	66	38	0	105	191
8:45	16	0	19	1	35	0	0	0	0	0	49	42	1	0	92	0	51	49	0	100	227
Total	21	0	29	2	50	0	0	0	0	0	140	165	1	0	306	1	249	146	0	396	752
Approach %	42.0	0.0	58.0	-	-	NaN	NaN	NaN	-	-	45.8	53.9	0.3	-	-	0.3	62.9	36.9	-	-	-
Total %	2.8	0.0	3.9	-	6.6	0.0	0.0	0.0	-	0.0	18.6	21.9	0.1	-	40.7	0.1	33.1	19.4	-	52.7	-
PHF	0.328	0.000	0.382	-	0.357	0.000	0.000	0.000	-	0.000	0.714	0.938	0.250	-	0.832	0.250	0.841	0.745	-	0.943	0.828
Lights	10	0	17	-	27	0	0	0	-	0	135	163	1	-	299	1	249	125	-	375	701
% Lights	47.6	-	58.6	-	54.0	-	-	-	-	-	96.4	98.8	100.0	-	97.7	100.0	100.0	85.6	-	94.7	93.2
Other Vehicles	11	0	12	-	23	0	0	0	-	0	5	2	0	-	7	0	0	21	-	21	51
% Other Vehicles	52.4	-	41.4	-	46.0	-	-	-	-	-	3.6	1.2	0.0	-	2.3	0.0	0.0	14.4	-	5.3	6.8
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	-	0.0	-	0.0	-	-	-	-	-	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0
Pedestrians	-	-	-	2	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Counter:: MIO
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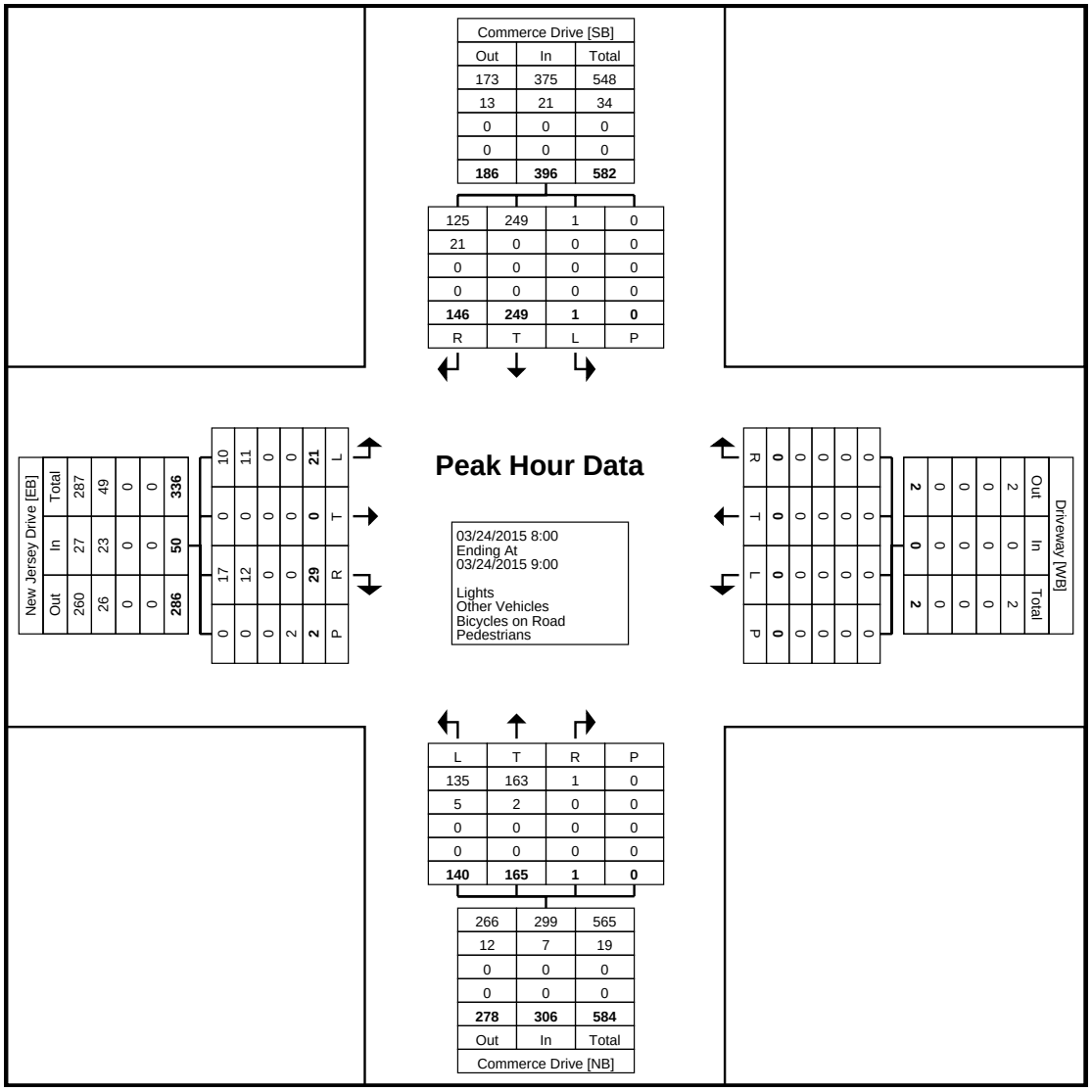
Count Name: Commerce Drive & New Jersey Drive - AM & PM
Site Code:
Start Date: 03/24/2015



Turning Movement Peak Hour Data Plot (8:00)

Counter:: MIO
Counted By:: RK
Weather:: Overcast

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Count Name: Commerce Drive & New Jersey Drive - AM & PM
Site Code:
Start Date: 03/24/2015

Turning Movement Peak Hour Data (16:45)

Start Time	New Jersey Drive Eastbound					Driveway Westbound					Commerce Drive Northbound					Commerce Drive Southbound					
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
16:45	15	0	13	0	28	0	0	1	1	1	6	57	4	0	67	0	47	10	0	57	153
17:00	44	0	40	0	84	2	0	0	0	2	5	72	4	0	81	0	45	8	0	53	220
17:15	29	0	31	0	60	0	0	2	0	2	7	77	3	0	87	0	29	6	0	35	184
17:30	30	0	55	0	85	0	0	2	0	2	7	45	1	0	53	0	34	4	0	38	178
Total	118	0	139	0	257	2	0	5	1	7	25	251	12	0	288	0	155	28	0	183	735
Approach %	45.9	0.0	54.1	-	-	28.6	0.0	71.4	-	-	8.7	87.2	4.2	-	-	0.0	84.7	15.3	-	-	-
Total %	16.1	0.0	18.9	-	35.0	0.3	0.0	0.7	-	1.0	3.4	34.1	1.6	-	39.2	0.0	21.1	3.8	-	24.9	-
PHF	0.670	0.000	0.632	-	0.756	0.250	0.000	0.625	-	0.875	0.893	0.815	0.750	-	0.828	0.000	0.824	0.700	-	0.803	0.835
Lights	117	0	137	-	254	2	0	5	-	7	20	251	12	-	283	0	154	27	-	181	725
% Lights	99.2	-	98.6	-	98.8	100.0	-	100.0	-	100.0	80.0	100.0	100.0	-	98.3	-	99.4	96.4	-	98.9	98.6
Other Vehicles	1	0	2	-	3	0	0	0	-	0	5	0	0	-	5	0	1	1	-	2	10
% Other Vehicles	0.8	-	1.4	-	1.2	0.0	-	0.0	-	0.0	20.0	0.0	0.0	-	1.7	-	0.6	3.6	-	1.1	1.4
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	-	0.0	-	0.0	0.0	-	0.0	-	0.0	0.0	0.0	0.0	-	0.0	-	0.0	0.0	-	0.0	0.0
Pedestrians	-	-	-	0	-	-	-	-	1	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-

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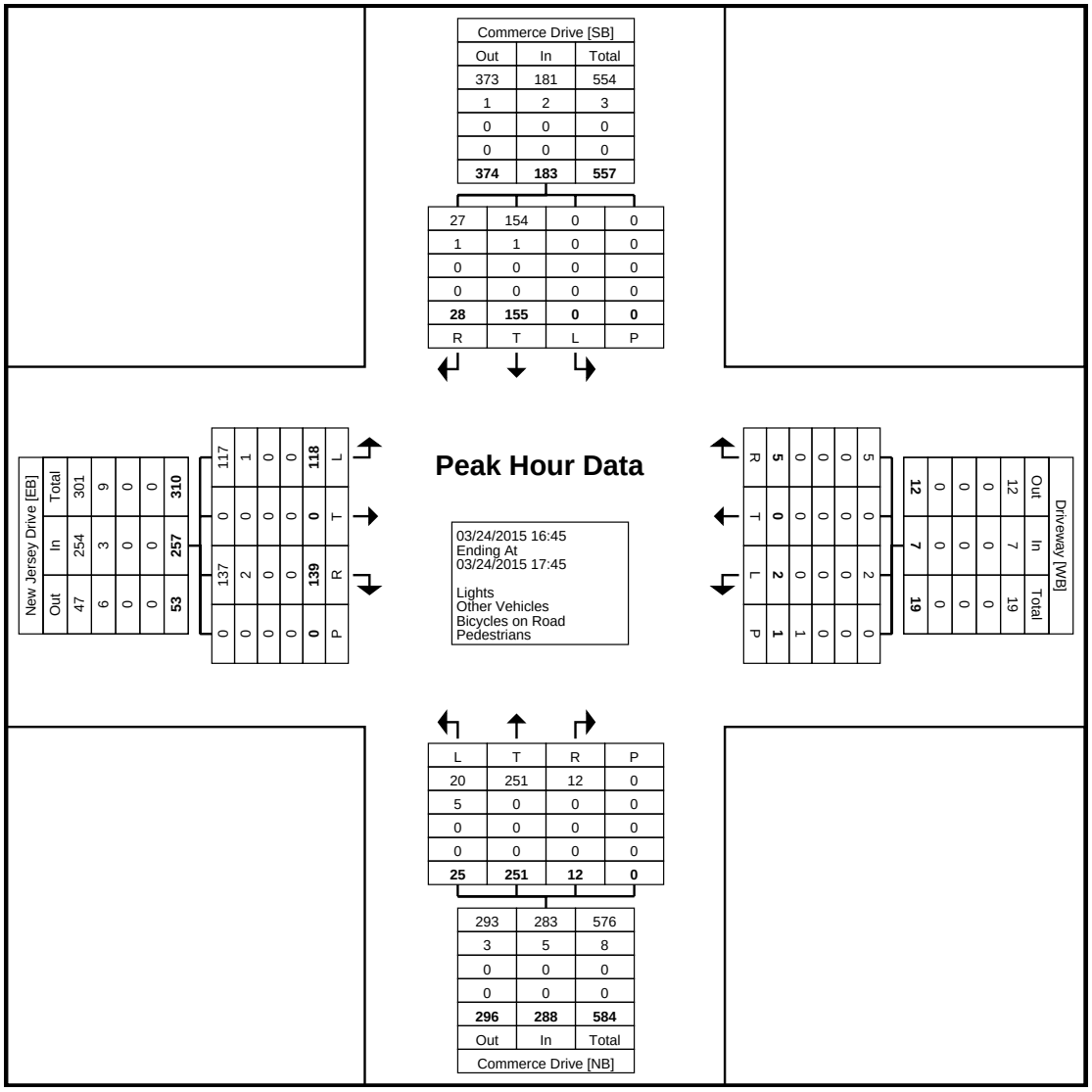
Count Name: Commerce Drive & New Jersey Drive - AM & PM
Site Code:
Start Date: 03/24/2015
Page No: 6



Turning Movement Peak Hour Data Plot (16:45)

Tick Mark Sheet

Street Name: 3/24/15	Driveway Eastbound						Commerce Drive Northbound			Commerce Drive Southbound		
	Left	Thru	Right				Left					Right
8:00 - 8:15							7					2
8:15 - 8:30			3				8					4
8:30 - 8:45			1				6					1
8:45 - 9:00			1				4					
:00 - :15 AM			5				25					7
:15 - :30												
:30 - :45												
4:45 - 5:00			4				2					
5:00 - 5:15	3		11				7					5
5:15 - 5:30	1		1				3					1
5:30 - 5:45												2
:45 - :00 PM	4		16				12					8

Tick Mark Sheet

Street Name:	New Jersey Drive			New Jersey Drive			Site Driveway					
3/24/15	Eastbound			Westbound			Northbound					
			Right	Left			Left		Right			
8:00 - 8:15												
8:15 - 8:30				III								
8:30 - 8:45				II					I			
8:45 - 9:00												
:00 - :15				5					1			
:15 - :30												
:30 - :45												
4:45 - 5:00				I			I		II			
5:00 - 5:15				III					IIIIII			
5:15 - 5:30				II					IIIIIII I			
5:30 - 5:45									I			
:45 - :00				6			1		16			

APPENDIX B

DAY CARE CENTER TRIP GENERATION ARTICLE

Trip Generation of Day Care Centers

Preston W. Hitchens, Jr. (S)[a]

INTRODUCTION

This research paper will provide additional insight into the trip making characteristics of day care centers in the metropolitan Philadelphia, Pennsylvania area. Data was collected at six operating day care centers in New Jersey and in Pennsylvania, and analyzed in several areas. The major focus of this work is directed towards trip generation, however peak parking demand, as well as average time parked during the morning and evening peak hours, was reviewed at two centers. Interviews were conducted at two centers during the evening rush hour to determine additional information about site related trips.

METHODOLOGY

Traffic data was collected at six operating day care centers in the metropolitan Philadelphia, Pennsylvania area. The locations of the centers were as follows:

Voorhees, New Jersey (2 centers)
Sewell, New Jersey
Moorestown, New Jersey
North Wales, Pennsylvania
Plymouth Meeting, Pennsylvania

Traffic counters monitored driveway activity at each of the above centers during a typical weekday of operation. In order to minimize parental anxiety, the vehicle used by the traffic counter was signed "Traffic Count" and all management staff at each center were briefed as to the purpose of the data collection. All six locations studied were located in commercial areas. Two centers were located near major employment centers, with the other four accessing heavily traveled roadways.

All of the centers required that an adult accompany children into the facility in the morning, where typically, the child was signed in by the parent. In the afternoon the parent was required to enter the day care center and sign out his or her child.

All of the six centers studied had an outdoor play area which was fenced, and located the maximum possible distance from the parking areas. Although the majority of enrollees were personally dropped off and picked up by parents, some of the centers had small omni-buses/vans (approximately 15 passenger) which picked up children at appropriate times from local schools. The buses were also utilized for field trips.

a Project Engineer
Pennoni Associates Inc.
1600 Callowhill Street
Philadelphia, PA U.S.A. 19130

Typical weekday operating hours at each center (with minor variations) were from 6:30 A.M. to 6:00 P.M. Discussions with managers at the respective centers revealed that some day care centers are offering parents extended hours on Friday evenings to approximately 11:00 P.M., and in some cases, sleep-over opportunities, where the enrolled child would spend the night at the day care center. These programs are marketed to parents as an opportunity for social activity on their part without compromising the safety of their children. For the centers extended hours and/or "sleep overs" offer increased revenue for the center. In addition, centers located near major employment centers offered programming to encourage parents to spend lunch time with their children, such has hoagie sales, "Easter parades", etc.

SITE CHARACTERISTICS

The following data was collected at each survey location:

- Building area (square feet)
- Number of Parking Spaces
- Number of Children in Attendance
- Number of Employees in Attendance.

Building areas of the centers varied from approximately 6,000 square feet to 8,400 square feet. Parking varied from 13-30 spaces at the study locations. Enrollment at the centers varied between 98-158 children, with between 9-26 employees on site.

TRIP GENERATION CHARACTERISTICS

The number of total trips during a typical weekday; and, during the morning and evening peak hours of each center was easily obtained from the traffic count information. Data at each location was analyzed with respect to number of enrolled children, gross building area in square feet, and number of employees at each center.

Linear regression analysis of total trip ends (T) vs. number of employees (E) on a typical weekday revealed the following relationship:

$$T = 15.41(E) + 103.68 \qquad R^2 = 0.865$$

Similarly, analysis of total trip ends (T) vs. number of enrolled children (C) resulted in the following equation:

$$T = 3.67(C) - 62.89 \qquad R^2 = 0.777$$

A comparison of total trip ends (T) vs. 1,000 square feet gross floor area (X) was modeled by the regression equation:

$$T = 65.78(X) - 98.33 \qquad R^2=0.651$$

Given the relatively low correlation coefficients and/or the limited data base, the above equations should be used very cautiously in modeling day center operations.

The following average trip rates were observed by this study:

Average Weekday Vehicle Trip Ends

20.78 trips/employee

52.85 trips/1000 s.f. gross floor area

3.26 trips/enrolled child

The range of rates of trips/employee varied from 17.90 trips/employee to 28.12 trips/employee. With respect to trips/1000 square feet of gross floor area, the rates ranged from 42.61 trips/1000 s.f. to 67.50 trips/1000 s.f. The range of rates of trips/enrolled child varied between 1.9 trips/enrolled child to 3.75 trips/child.

The following average trip rates were observed during the A.M. and P.M. peak hours of the generator:

A.M. Peak Hour of Generator

4.09 trips/employee

0.64 trips/enrollee

10.42 trips/1000 s.f. gross floor area

P.M. Peak Hour of Generator

4.12 trips/employee

0.65 trips/enrollee

10.50 trips/1000 s.f. gross floor area

In addition to determining average trip rates for several dependent variables, the average hourly variation of day care center traffic for the locations studied was determined.

Average Hourly Variation of Day Care Center Traffic

Hour Ending:	Percentage of Trips
7:00 A.M.	3%
8:00 A.M.	16%
9:00 A.M.	16%
10:00 A.M.	8%
11:00 A.M.	2%
12:00 NOON	4%
1:00 P.M.	5%
2:00 P.M.	3%
3:00 P.M.	4%
4:00 P.M.	6%
5:00 P.M.	12%
6:00 P.M.	19%

PARENTS' INTERVIEWS

In order to gain additional insight into the trip making characteristics of day care centers, interviews of parents were conducted during the P.M. peak hour at two locations. Parents were asked where their trip had begun, where it would end, and its approximate length. Parents were also asked as to whether or not they would have "passed by" the day care center in their normal home/work commute. The following are the results of our interviews:

Trip Origination:

28% --home

72% --work

Trip Destination:

68% --directly home

32% --elsewhere

Type of Trip:

24% --primary trip (home to center to home)

44% --pass-by trip (from work to home)

32% --diverted trip (from work to home)

Trip Length:

< 1 mile:	20%
1-2 miles:	16%
2-5 miles:	4%
5-10 miles:	44%
> 10 miles:	16%

Number of Children at Center:

1 child:	68%
2 children:	32%

PARKING CHARACTERISTICS

Although the primary emphasis of this study was trip generation of day care centers, parking data was collected at two facilities. Peak parking rates were observed, as well as length of time parked during the morning and evening peak hours. The average peak parking rate was found to be 2.36 spaces/1000 square feet gross floor area. Parents parked an average of 5.6 minutes during the morning peak period and 6.8 minutes during the evening peak. Additional parking data should be collected on day care centers.

CONCLUSIONS

This paper has reviewed trip making characteristics of six operating day care centers in the Philadelphia, Pennsylvania area. The traffic count data was analyzed with respect to the number of employees, the number of enrolled children, and the square feet of gross floor area at each center.

Equations, obtained by linear regression analysis, are presented relating total trip ends vs. the number of employees, total trip ends vs. the number of enrolled children and total trip ends vs. the square feet of gross floor area at each center. In addition, average trip rates are developed for daily trips, A.M. peak hour of generator trips and P.M. peak hour of generator trips.

A comparison of the average trip rates determined by this study; and those published in Trip Generation, (4th Edition, Institute of Transportation Engineers,1987) shows some differences. The rates presented for trips/employee by this study are approximately 55% lower than that presented in Trip Generation. The average trip rate presented for trips/1000 s.f. gross floor area were well within ITE range. The differences in the average trip rates determined by this study are most likely attributable to differences in regulations pertaining to day care throughout the country. It is recommended that additional studies be done in the Philadelphia, Pennsylvania area and elsewhere to further supplement the data base on this land use code.

APPENDIX C

CAPACITY ANALYSIS

EXISTING CONDITIONS

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	21	29	140	165	249	146
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles (%)	52%	41%	4%	1%	0%	14%
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary
Control Type: Unsignalized

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	21	29	140	165	249	146
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	-2	-	-	-1	-3	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	52	41	4	1	0	14
Mvmt Flow	25	35	169	199	300	176

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	825	388	476	0	-	0
Stage 1	388	-	-	-	-	-
Stage 2	437	-	-	-	-	-
Critical Hdwy	7.7	7.2	3.9	-	-	-
Critical Hdwy Stg 1	5.78	-	-	-	-	-
Critical Hdwy Stg 2	6.18	-	-	-	-	-
Follow-up Hdwy	2.8	2.9	2.4	-	-	-
Pot Cap-1 Maneuver	298	665	1045	-	-	-
Stage 1	799	-	-	-	-	-
Stage 2	716	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	244	665	1045	-	-	-
Mov Cap-2 Maneuver	244	-	-	-	-	-
Stage 1	799	-	-	-	-	-
Stage 2	586	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16	4.3	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1045	-	386	-	-
HCM Lane V/C Ratio	0.161	-	0.156	-	-
HCM Control Delay (s)	9.1	0.3	16	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.6	-	0.5	-	-

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	5	25	305	278	7
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles (%)	0%	0%	0%	4%	5%	0%
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary
Control Type: Unsignalized

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	0	5	25	305	278	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	-1	1	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	0	0	0	4	5	0
Mvmt Flow	0	6	30	367	335	8

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	583	172	343	0	-	0
Stage 1	339	-	-	-	-	-
Stage 2	244	-	-	-	-	-
Critical Hdwy	7.7	7.2	3.9	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	2.8	2.9	2.4	-	-	-
Pot Cap-1 Maneuver	460	942	1157	-	-	-
Stage 1	847	-	-	-	-	-
Stage 2	953	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	445	942	1157	-	-	-
Mov Cap-2 Maneuver	445	-	-	-	-	-
Stage 1	847	-	-	-	-	-
Stage 2	922	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.8	0.7	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1157	-	942	-	-
HCM Lane V/C Ratio	0.026	-	0.006	-	-
HCM Control Delay (s)	8.2	0.1	8.8	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0	-	-

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	50	0	5	286	0	1
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles (%)	52%	0%	0%	14%	0%	0%
Shared Lane Traffic (%)						
Sign Control	Free			Free	Stop	

Intersection Summary
Control Type: Unsignalized

Intersection	
Int Delay, s/veh	0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	50	0	5	286	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	-5	-	-	2	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	52	0	0	14	0	0
Mvmt Flow	60	0	6	345	0	1

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	60	0	417	60
Stage 1	-	-	-	-	60	-
Stage 2	-	-	-	-	357	-
Critical Hdwy	-	-	4.3	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	3	-	3	3.1
Pot Cap-1 Maneuver	-	-	1145	-	677	1075
Stage 1	-	-	-	-	1124	-
Stage 2	-	-	-	-	812	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1145	-	673	1075
Mov Cap-2 Maneuver	-	-	-	-	673	-
Stage 1	-	-	-	-	1124	-
Stage 2	-	-	-	-	807	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	8.4
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1075	-	-	1145	-
HCM Lane V/C Ratio	0.001	-	-	0.005	-
HCM Control Delay (s)	8.4	-	-	8.2	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	118	139	25	251	155	28
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles (%)	1%	2%	20%	0%	1%	4%
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary
Control Type: Unsignalized

Intersection	
Int Delay, s/veh	5.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	118	139	25	251	155	28
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	-2	-	-	-1	-3	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	1	2	20	0	1	4
Mvmt Flow	140	165	30	299	185	33

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	410	201	218	0	-	0
Stage 1	201	-	-	-	-	-
Stage 2	209	-	-	-	-	-
Critical Hdwy	7.7	7.2	3.9	-	-	-
Critical Hdwy Stg 1	5.015	-	-	-	-	-
Critical Hdwy Stg 2	5.415	-	-	-	-	-
Follow-up Hdwy	2.8	2.9	2.4	-	-	-
Pot Cap-1 Maneuver	625	900	1273	-	-	-
Stage 1	1050	-	-	-	-	-
Stage 2	1017	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	608	900	1273	-	-	-
Mov Cap-2 Maneuver	608	-	-	-	-	-
Stage 1	1050	-	-	-	-	-
Stage 2	989	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.3	0.8	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1273	-	737	-	-
HCM Lane V/C Ratio	0.023	-	0.415	-	-
HCM Control Delay (s)	7.9	0.1	13.3	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	2.1	-	-

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	4	16	12	276	294	8
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles (%)	0%	0%	0%	20%	3%	0%
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary
Control Type: Unsignalized

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	4	16	12	276	294	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	-1	1	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	0	0	0	20	3	0
Mvmt Flow	5	19	14	329	350	10

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	548	180	360	0	-	0
Stage 1	355	-	-	-	-	-
Stage 2	193	-	-	-	-	-
Critical Hdwy	7.7	7.2	3.9	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	2.8	2.9	2.4	-	-	-
Pot Cap-1 Maneuver	489	930	1142	-	-	-
Stage 1	830	-	-	-	-	-
Stage 2	1015	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	482	930	1142	-	-	-
Mov Cap-2 Maneuver	482	-	-	-	-	-
Stage 1	830	-	-	-	-	-
Stage 2	1000	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.7	0.4	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1142	-	784	-	-
HCM Lane V/C Ratio	0.013	-	0.03	-	-
HCM Control Delay (s)	8.2	0.1	9.7	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	257	0	6	53	1	16
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles (%)	2%	0%	0%	20%	0%	0%
Shared Lane Traffic (%)						
Sign Control	Free			Free	Stop	

Intersection Summary
Control Type: Unsignalized

Intersection	
Int Delay, s/veh	0.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	257	0	6	53	1	16
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	-5	-	-	2	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	2	0	0	20	0	0
Mvmt Flow	306	0	7	63	1	19

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	306	0	383	306
Stage 1	-	-	-	-	306	-
Stage 2	-	-	-	-	77	-
Critical Hdwy	-	-	4.3	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	3	-	3	3.1
Pot Cap-1 Maneuver	-	-	943	-	709	780
Stage 1	-	-	-	-	859	-
Stage 2	-	-	-	-	1104	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	943	-	703	780
Mov Cap-2 Maneuver	-	-	-	-	703	-
Stage 1	-	-	-	-	859	-
Stage 2	-	-	-	-	1095	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.9	9.8
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	775	-	-	943	-
HCM Lane V/C Ratio	0.026	-	-	0.008	-
HCM Control Delay (s)	9.8	-	-	8.8	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

PROJECTED CONDITIONS

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	32	29	140	175	261	158
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles (%)	52%	41%	4%	1%	0%	14%
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary
Control Type: Unsignalized

Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	32	29	140	175	261	158
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	-2	-	-	-1	-3	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	52	41	4	1	0	14
Mvmt Flow	39	35	169	211	314	190

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	853	410	505	0	-	0
Stage 1	410	-	-	-	-	-
Stage 2	443	-	-	-	-	-
Critical Hdwy	7.7	7.2	3.9	-	-	-
Critical Hdwy Stg 1	5.78	-	-	-	-	-
Critical Hdwy Stg 2	6.18	-	-	-	-	-
Follow-up Hdwy	2.8	2.9	2.4	-	-	-
Pot Cap-1 Maneuver	284	642	1022	-	-	-
Stage 1	777	-	-	-	-	-
Stage 2	710	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	231	642	1022	-	-	-
Mov Cap-2 Maneuver	231	-	-	-	-	-
Stage 1	777	-	-	-	-	-
Stage 2	577	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	18.9	4.3	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1022	-	332	-	-
HCM Lane V/C Ratio	0.165	-	0.221	-	-
HCM Control Delay (s)	9.2	0.3	18.9	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.6	-	0.8	-	-

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	10	27	49	305	278	19
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles (%)	0%	0%	0%	4%	5%	0%
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	

Intersection Summary
Control Type: Unsignalized

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	10	27	49	305	278	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	-1	1	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	0	0	0	4	5	0
Mvmt Flow	12	33	59	367	335	23

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	648	179	358	0	-	0
Stage 1	346	-	-	-	-	-
Stage 2	302	-	-	-	-	-
Critical Hdwy	7.7	7.2	3.9	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	2.8	2.9	2.4	-	-	-
Pot Cap-1 Maneuver	409	932	1144	-	-	-
Stage 1	840	-	-	-	-	-
Stage 2	887	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	382	932	1144	-	-	-
Mov Cap-2 Maneuver	382	-	-	-	-	-
Stage 1	840	-	-	-	-	-
Stage 2	829	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.7	1.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1144	-	671	-	-
HCM Lane V/C Ratio	0.052	-	0.066	-	-
HCM Control Delay (s)	8.3	0.2	10.7	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.2	-	0.2	-	-

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	50	0	17	286	0	12
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles (%)	52%	0%	0%	14%	0%	0%
Shared Lane Traffic (%)						
Sign Control	Free			Free	Stop	

Intersection Summary
Control Type: Unsignalized

Intersection	
Int Delay, s/veh	0.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	50	0	17	286	0	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	-5	-	-	2	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	52	0	0	14	0	0
Mvmt Flow	60	0	20	345	0	14

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	60	0	446	60
Stage 1	-	-	-	-	60	-
Stage 2	-	-	-	-	386	-
Critical Hdwy	-	-	4.3	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	3	-	3	3.1
Pot Cap-1 Maneuver	-	-	1145	-	650	1075
Stage 1	-	-	-	-	1124	-
Stage 2	-	-	-	-	787	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1145	-	636	1075
Mov Cap-2 Maneuver	-	-	-	-	636	-
Stage 1	-	-	-	-	1124	-
Stage 2	-	-	-	-	770	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	8.4
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1075	-	-	1145	-
HCM Lane V/C Ratio	0.013	-	-	0.018	-
HCM Control Delay (s)	8.4	-	-	8.2	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0.1	-

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	131	139	25	263	166	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	14	11	11	11	11
Grade (%)	-2%			-1%	-3%	
Link Speed (mph)	25			35	35	
Link Distance (ft)	222			214	542	
Travel Time (s)	6.1			4.2	10.6	
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	5.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	131	139	25	263	166	39
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	-2	-	-	-1	-3	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	1	2	20	0	1	4
Mvmt Flow	156	165	30	313	198	46

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	437	221	244	0	-	0
Stage 1	221	-	-	-	-	-
Stage 2	216	-	-	-	-	-
Critical Hdwy	7.7	7.2	3.9	-	-	-
Critical Hdwy Stg 1	5.015	-	-	-	-	-
Critical Hdwy Stg 2	5.415	-	-	-	-	-
Follow-up Hdwy	2.8	2.9	2.4	-	-	-
Pot Cap-1 Maneuver	596	871	1248	-	-	-
Stage 1	1029	-	-	-	-	-
Stage 2	1009	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	579	871	1248	-	-	-
Mov Cap-2 Maneuver	579	-	-	-	-	-
Stage 1	1029	-	-	-	-	-
Stage 2	980	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.4	0.8	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1248	-	700	-	-
HCM Lane V/C Ratio	0.024	-	0.459	-	-
HCM Control Delay (s)	8	0.1	14.4	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	2.4	-	-

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	16	40	34	276	294	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	11	11	11	11
Grade (%)	0%			-1%	1%	
Link Speed (mph)	25			35	35	
Link Distance (ft)	88			156	214	
Travel Time (s)	2.4			3.0	4.2	
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	16	40	34	276	294	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	-1	1	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	0	0	0	20	3	0
Mvmt Flow	19	48	40	329	350	23

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	606	186	373	0	-	0
Stage 1	361	-	-	-	-	-
Stage 2	245	-	-	-	-	-
Critical Hdwy	7.7	7.2	3.9	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	2.8	2.9	2.4	-	-	-
Pot Cap-1 Maneuver	441	921	1131	-	-	-
Stage 1	824	-	-	-	-	-
Stage 2	952	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	422	921	1131	-	-	-
Mov Cap-2 Maneuver	422	-	-	-	-	-
Stage 1	824	-	-	-	-	-
Stage 2	911	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.8	1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1131	-	688	-	-
HCM Lane V/C Ratio	0.036	-	0.097	-	-
HCM Control Delay (s)	8.3	0.1	10.8	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	-	-

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	257	0	17	53	1	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	14	14	14	14	10
Grade (%)	-5%			2%	0%	
Link Speed (mph)	25			25	25	
Link Distance (ft)	378			222	95	
Travel Time (s)	10.3			6.1	2.6	
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

Intersection	
Int Delay, s/veh	1.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	257	0	17	53	1	29
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	-5	-	-	2	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	2	0	0	20	0	0
Mvmt Flow	306	0	20	63	1	35

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	306	0	410	306
Stage 1	-	-	-	-	306	-
Stage 2	-	-	-	-	104	-
Critical Hdwy	-	-	4.3	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	3	-	3	3.1
Pot Cap-1 Maneuver	-	-	943	-	683	780
Stage 1	-	-	-	-	859	-
Stage 2	-	-	-	-	1072	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	943	-	668	780
Mov Cap-2 Maneuver	-	-	-	-	668	-
Stage 1	-	-	-	-	859	-
Stage 2	-	-	-	-	1048	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.2	9.9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	776	-	-	943	-
HCM Lane V/C Ratio	0.046	-	-	0.021	-
HCM Control Delay (s)	9.9	-	-	8.9	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

APPENDIX D

GAP STUDY PRINTOUTS

Gap Calculation for Unsignalized Intersection
Left Turn from Minor Road to Two-Lane Major Road

Intersection: **Major St.** **Commerce Drive**
Minor St. **Site Driveway**

Time Studied: **Weekday A.M. Peak Hour**
Date of Study: **Tuesday, March 24, 2015**

Critical Gap: **7.1**
Follow-Up Time: **3**

Length of Gap (seconds)	Vehicles Accomodated	Number of Gaps Observed	Total Vehicles
2.00 - 3.99	0	132	0
4.00 - 5.99	0	72	0
6.00 - 7.99	0	42	0
8.00 - 9.99	1	39	39
10.00 - 11.99	2	23	46
12.00 - 13.99	2	18	36
14.00 - 15.99	3	11	33
16.00 - 17.99	4	9	36
18.00 - 19.99	4	7	28
20.00 - 21.99	5	6	30
22.00 - 23.99	6	7	42
24.00 - 25.99	6	2	12
26.00 - 27.99	7	5	35
28.00 - 29.99	8	9	72
> 30.00	8	0	0
Total Vehicles Accomodated			**409**

Minimum Gap	Number of Cars
0	0
7.1	1
10.1	2
13.1	3
16.1	4
19.1	5
22.1	6
25.1	7
28.1	8
31.1	9
34.1	10
37.1	11
40.1	12
43.1	13
46.1	14
49.1	15
52.1	16
55.1	17
58.1	18
61.1	19
64.1	20

Gap Calculation for Unsignalized Intersection
Left Turn from Minor Road to Two-Lane Major Road

Intersection: **Major St.** **Commerce Drive**
Minor St. **Site Driveway**

Time Studied: **Weekday P.M. Peak Hour**
Date of Study: **Tuesday, March 24, 2015**

Critical Gap: **7.1**
Follow-Up Time: **3**

Length of Gap (seconds)	Vehicles Accomodated	Number of Gaps Observed	Total Vehicles
2.00 - 3.99	0	114	0
4.00 - 5.99	0	63	0
6.00 - 7.99	0	36	0
8.00 - 9.99	1	26	26
10.00 - 11.99	2	21	42
12.00 - 13.99	2	19	38
14.00 - 15.99	3	9	27
16.00 - 17.99	4	17	68
18.00 - 19.99	4	2	8
20.00 - 21.99	5	8	40
22.00 - 23.99	6	6	36
24.00 - 25.99	6	5	30
26.00 - 27.99	7	5	35
28.00 - 29.99	8	13	104
> 30.00	8	0	0
Total Vehicles Accomodated			**454**

Minimum Gap	Number of Cars
0	0
7.1	1
10.1	2
13.1	3
16.1	4
19.1	5
22.1	6
25.1	7
28.1	8
31.1	9
34.1	10
37.1	11
40.1	12
43.1	13
46.1	14
49.1	15
52.1	16
55.1	17
58.1	18
61.1	19
64.1	20

***There are 43 gaps that are between 6 seconds and 8 seconds. The chart above assumes that zero of those gaps are 7.1 seconds are greater. It can be assumed that at least one of those gaps is 7.1 seconds. Therefore, there is capacity for at least 164 vehicles.**

Gap Calculation for Unsignalized Intersection
Left Turn from Minor Road to Two-Lane Major Road

Intersection: **Major St.** **New Jersey Drive**
Minor St. **Site Driveway**

Time Studied: **Weekday A.M. Peak Hour**
Date of Study: **Tuesday, March 24, 2015**

Critical Gap: **7.1**
Follow-Up Time: **3**

Length of Gap (seconds)	Vehicles Accomodated	Number of Gaps Observed	Total Vehicles
2.00 - 3.99	0	30	0
4.00 - 5.99	0	24	0
6.00 - 7.99	0	24	0
8.00 - 9.99	1	16	16
10.00 - 11.99	2	21	42
12.00 - 13.99	2	14	28
14.00 - 15.99	3	8	24
16.00 - 17.99	4	11	44
18.00 - 19.99	4	9	36
20.00 - 21.99	5	5	25
22.00 - 23.99	6	5	30
24.00 - 25.99	6	2	12
26.00 - 27.99	7	4	28
28.00 - 29.99	8	3	24
> 30.00	8	27	216
Total Vehicles Accomodated			**525**

Minimum Gap	Number of Cars
0	0
7.1	1
10.1	2
13.1	3
16.1	4
19.1	5
22.1	6
25.1	7
28.1	8
31.1	9
34.1	10
37.1	11
40.1	12
43.1	13
46.1	14
49.1	15
52.1	16
55.1	17
58.1	18
61.1	19
64.1	20

Gap Calculation for Unsignalized Intersection
Left Turn from Minor Road to Two-Lane Major Road

Intersection: **Major St.** **New Jersey Drive**
Minor St. **Site Driveway**

Time Studied: **Weekday P.M. Peak Hour**
Date of Study: **Tuesday, March 24, 2015**

Critical Gap: **7.1**
Follow-Up Time: **3**

Length of Gap (seconds)	Vehicles Accomodated	Number of Gaps Observed	Total Vehicles
2.00 - 3.99	0	57	0
4.00 - 5.99	0	50	0
6.00 - 7.99	0	31	0
8.00 - 9.99	1	18	18
10.00 - 11.99	2	25	50
12.00 - 13.99	2	22	44
14.00 - 15.99	3	6	18
16.00 - 17.99	4	9	36
18.00 - 19.99	4	21	84
20.00 - 21.99	5	5	25
22.00 - 23.99	6	3	18
24.00 - 25.99	6	7	42
26.00 - 27.99	7	10	70
28.00 - 29.99	8	1	8
> 30.00	8	19	152
Total Vehicles Accomodated			**565**

Minimum Gap	Number of Cars
0	0
7.1	1
10.1	2
13.1	3
16.1	4
19.1	5
22.1	6
25.1	7
28.1	8
31.1	9
34.1	10
37.1	11
40.1	12
43.1	13
46.1	14
49.1	15
52.1	16
55.1	17
58.1	18
61.1	19
64.1	20

***There are 43 gaps that are between 6 seconds and 8 seconds. The chart above assumes that zero of those gaps are 7.1 seconds are greater. It can be assumed that at least one of those gaps is 7.1 seconds. Therefore, there is capacity for at least 164 vehicles.**